

TECHNICAL STANDARD OPERATING PROCEDURE

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Date: June 14, 1999 (Rev. # 0)

SOP No. ISSI-VBI70-03

Title: RESIDENTIAL SOIL SAMPLING FOR ALLEYWAY SOILS

APPROVALS:

Author _____ ISSI Consulting Group, Inc. _____

Date: June 14, 1999

SYNOPSIS: A standardized method for residential alleyway surface soil sampling is described. Protocols for sample collection, and sample handling are provided.

Received by QA Unit:

REVIEWS:

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide a standardized method for residential alleyway surface soil sampling to be used by employees of USEPA Region 8 contractors/subcontractors supporting USEPA Region 8 projects and tasks. This SOP describes the equipment and operations used for sampling alleyway surface soils in residential areas which will produce data that can be used to support risk evaluations. Site-specific deviations from the procedures outlined in this document must be approved by the USEPA Region 8 Remedial Project Manager, or Regional Toxicologist prior to initiation of the sampling activity.

2.0 RESPONSIBILITIES

The Field Project Leader (FPL) may be an USEPA employee or contractor who is responsible for overseeing the residential yard and alleyway surface soil sampling activities. The FPL is also responsible for checking all work performed and verifying that the work satisfies the specific tasks outlined by this SOP and the Project Plan. It is the responsibility of the FPL to communicate with the Field Personnel regarding specific collection objectives and anticipated situations that require any deviation from the Project Plan. It is also the responsibility of the FPL to communicate the need for any deviations from the Project Plan with the appropriate USEPA Region 8 personnel (Remedial Project Manager, or Regional Toxicologist).

Field personnel performing residential alleyway soil sampling are responsible for adhering to the applicable tasks outlined in this procedure while collecting samples at residences.

3.0 EQUIPMENT

- Soil augers - Various models of soil augers are acceptable and selection of the specific brand and make of tool will be recommended by the contractor implementing the field work (Morrison Knudsen Corporation). Augers are usually made of stainless steel, and should be capable of retrieving a cylindrical plug of soil 2 inches in diameter and 2 inches long. In all cases the procedures recommended by the manufacturers should be followed with regard to use of the auger. Augers with disposable plastic sleeves may be employed to minimize the decontamination effort.
- Collection containers - plastic ziplock bags
- Trowels - for extruding the soil sample from the auger. May be plastic or stainless steel.
- Gloves - for personal protection and to prevent cross-contamination of samples. May be plastic or latex. Disposable, powderless.

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- Field clothing and Personal Protective Equipment - as specified in the Health and Safety Plan.
- Field notebook -used to record progress of sampling effort and record any problems and field observations.
- Permanent marking pen - used to label sample containers.
- Three-ring binder book - to store necessary forms used to record and track samples collected at the VBI70 site. Binders will contain the Alleyway Data Collection Sheet, Site Diagram, and sample labels for each day.
- Measuring tape or pocket ruler -used to measure the length of soil core in the soil coring device.
- Trash Bag - used to dispose gloves and wipes.

4.0 SAMPLING PATTERN - ALLEYWAY SOIL

Currently, the relationship between a residence with elevated (>200 ppm) arsenic concentrations in yard soil and possible adjacent alleyways is not understood. For the purposes of this pilot investigation, a minimum of four and a maximum of six alleyway units located adjacent to a residence with elevated (>200 ppm) arsenic concentration will be identified and sampled. Priority will be given to locations where a composite has been collected for all or most of the properties in the study location, and where indoor dust samples have been collected. Grab samples will be collected in a pattern similar to that shown in Figure 1.

Prior to sampling the FPL will provide maps that identify the alleyways and individual sample locations. The map will be generated using GIS tool used to identify and document sample locations as well as provide the approximate dimensions of the alleyway and other landmarks. In the event that sample locations must be offset due to the presence of obstructions, the new location must be clearly marked on the map. Grab sample locations will be placed along a center transect of the selected alleyway and three samples will be collected across the alley (see Figure 1). Approximately 30 grab samples will be collected from the entire block. The three samples are located in the center and two sides of the alley where the two sides are about 2 feet from the property line of residences that border the alleyway.

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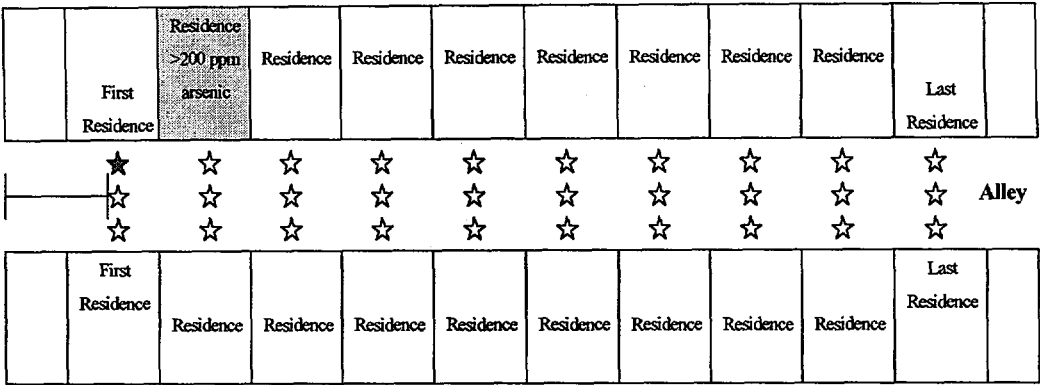


Figure 1 Idealized Alleyway Sampling Strategy

Grab samples will be collected from the 0-2 inch soil horizon and placed into a separate plastic ziplock bag. Each sample will be collected using a clean auger and trowel, and identified with a unique number ending with “-R” provided on the sample labels. One label is placed on the Alleyway Soil Collection Data Sheet (Attachment 1) and the other label is affixed to the zip-lock bag containing the sample. Sample labeling will occur as prescribed below:

- Place the red pre-printed label ending with the “-R” onto the zip-lock bag (See Sample Identification and Tracking SOP# ISSI-VBI70-01).
- Place the blue pre-printed label ending with the “-R” onto the Alleyway Soil Data Collection Sheet.
- Place the 30 grab samples into a larger (gallon size or larger) zip-lock bag that has been marked on the outside of the bag with the alleyway identification number with permanent marker.

5.0 COLLECTION OF SOIL SAMPLES USING A SOIL AUGER

A new pair of plastic gloves are to be worn at each sample point.

Place the soil coring tool on the ground and position it vertically. Holding the tool handle with both hands, apply pressure sufficient to drive the tool approximately 2 inches into the ground while applying a slight twisting force to the coring tool. Remove the tool by pulling up on the handle while simultaneously applying a twisting force. If the sample was retrieved successfully, a plug of soil approximately two inches long should have been removed with the coring tool.

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Hold the soil coring tool horizontally or place it on the ground. Using a clean spatula or knife, remove the soil collected at depth greater than two inches from the end of the sampling tool. Allow this soil to fall into the plastic bucket designated for excess soil material. Use a trowel to extrude the soil from the auger, pushing the two-inch soil plug from the coring tool so that it falls directly into the zip-lock bag.

Care should be taken to avoid tracking soil from one area to another. As samples are taken sequentially, care should also be taken not to contaminate an area yet to be sampled with the residue of the sample that is currently being taken. In general one should move in a single direction through the sampling area. If an area is known or suspected of having a higher concentration of metals, all other considerations being equal, it should be sampled last to prevent cross contamination.

Decontaminate equipment as described in Section 9.0.

6.0 SAMPLE CONTAINERS AND LABELING

Following the procedures outlined in Section 5.0, grab samples will be collected directly into zip lock bags and labeled in accord with the most recent version of the Sample Identification and Tracking SOP (# ISSI-VBI70-01). Each sample must have a sample identification number affixed to the zip-lock bag, and also attached to the Alleyway Soil Data Sheet.

7.0 SITE CLEAN-UP

Each hole made in the yard using the auger must be backfilled with clean topsoil and tamped down lightly. If sod was removed to obtain the soil sample, the hole should first be backfilled and then the grass plug be replaced by the field personnel.

Rinse water used for sample decontamination that is generated in the course of sample collection must be disposed of as specified in the SOP for Investigation Derived Waste Management (MK-VBI70-04). Wherever possible, sod and soil (not collected and retained as part of the composite sample) should be replaced in the same hole.

All 30 flags (if reused) should be decontaminated by wiping off with towels and/or baby wipes before re-use.

Throw all used wipes and gloves into the trash bags and take with you to dispose of at the field office.

8.0 FIELD QUALITY ASSURANCE/QUALITY CONTROL

Adherence to quality assurance/quality control (QA/QC) procedures is an important part of field sample collection. Field QA/QC procedures include documentation requirements and

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preparation of field QC samples.

8.1 Field Quality Control Samples

The following QC sample will be collected during alleyway soil sampling.

Field Duplicate: Field duplicate samples are co-located samples at a single grab sample location. These samples are submitted blind to the laboratory to test both the precision of the laboratory analysis and the precision of sample collection. Field duplicates are required to be collected at a frequency of 5% of all surface soil samples collected (1 field duplicate per 20 investigation samples collected).

8.2 Field documentation

A field notebook should be maintained by each individual or team that is collecting samples as described in the Project Plan. For each alleyway, the following information should be collected.

- date
- time
- personnel
- weather conditions
- a sketch of the sampling pattern that is filled in with sample identification numbers as the samples are collected
- locations of any samples that could not be acquired
- descriptions of any deviations to the Project Plan and the reason for the deviation

Samples taken from soils with visible staining or other indications of non-homogeneous conditions should be noted. Use the maps provided by the FPL or draw a diagram that details each alleyway. Sample locations and sample numbers should be identified on the diagram.

In addition, each field crew will maintain a three-ring binder book that has Alleyway Soil Data Sheets and sample labels needed for each day. At the end of the day, the field crew will submit these forms and check them in with the FPL at the time that the samples are checked in.

Field personnel will collect the proper type and quantity of quality control samples as prescribed in the Project Plan.

9.0 DECONTAMINATION

Because decontamination procedures are time consuming, having a quantity of sampling tools sufficient to require decontamination at a maximum of once per day is recommended. All sampling equipment must be decontaminated prior to reuse. Follow the procedures outlined in SOP No. MK-VBI70-07.

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10.0 GLOSSARY

Project Plan - The written document that spells out the detailed site-specific procedures to be followed by the Project Leader and the Field Personnel.

Sample Point - The actual location at which the sample is taken. The dimensions of a sample Point are 2" in diameter and 2" deep.

11.0 REFERENCES

USEPA, 1995. Residential Sampling for Lead: Protocols for Dust and Soil Sampling, Final Report, EPA 747-R-95-001, USEPA, March 1995, 38 p.

American Society for Testing and Materials, 1995. Standard Practice for Field Collection of Soil Samples for Lead Determination by Atomic Spectrometry Techniques, ASTM Designation: E 1727 - 95, October 1995, 3 p.

ATTACHMENTS

ATTACHMENT 1
ALLEYWAY SOIL DATA SHEET

PHASE: 3MEDIUM: Alley Soil

DATE: _____

DEPTH: 0-2"

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ALLEYWAY ID: _____ SAMPLE COLLECTION METHOD: ISSI-VBI70-03 Revision 0

SAMPLE TEAM ID: _____

INDEX	MAP POSITION	SAMPLE NO.	CLASS FS = Field Sample FD = Field Duplicate	SAMPLE TYPE (circle one)
1			FS FD	COMP GRAB
2			FS FD	COMP GRAB
3			FS FD	COMP GRAB
4			FS FD	COMP GRAB
5			FS FD	COMP GRAB
6			FS FD	COMP GRAB
7			FS FD	COMP GRAB

ALLEY ID: _____

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INDEX	MAP POSITION	SAMPLE NO.	CLASS FS = Field Sample FD = Field Duplicate	SAMPLE TYPE (circle one)
8			FS FD	COMP GRAB
9			FS FD	COMP GRAB
10			FS FD	COMP GRAB
11			FS FD	COMP GRAB
12			FS FD	COMP GRAB
13			FS FD	COMP GRAB
14			FS FD	COMP GRAB
15			FS FD	COMP GRAB

ALLEY ID: _____

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INDEX	MAP POSITION	SAMPLE NO.	CLASS FS = Field Sample FD = Field Duplicate	SAMPLE TYPE (circle one)
16			FS FD	COMP GRAB
17			FS FD	COMP GRAB
18			FS FD	COMP GRAB
19			FS FD	COMP GRAB
20			FS FD	COMP GRAB
21			FS FD	COMP GRAB
22			FS FD	COMP GRAB
23			FS FD	COMP GRAB

ALLEY ID: _____

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INDEX	MAP POSITION	SAMPLE NO.	CLASS FS = Field Sample FD = Field Duplicate	SAMPLE TYPE (circle one) COMP GRAB
24			FS FD	COMP GRAB
25			FS FD	COMP GRAB
26			FS FD	COMP GRAB
27			FS FD	COMP GRAB
28			FS FD	COMP GRAB
29			FS FD	COMP GRAB
30			FS FD	COMP GRAB

ALLEY ID: _____

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INDEX	MAP POSITION	SAMPLE NO.	CLASS FS = Field Sample FD = Field Duplicate	SAMPLE TYPE (circle one) COMP GRAB	ORIGINAL SAMPLE NO.
31			FS FD	COMP GRAB	
32			FS FD	COMP GRAB	
33			FS FD	COMP GRAB	

Samples Collected by:

Signature_____
Date

Logbook Page Reviewed by:

Signature_____
Date